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**Report To The Chairman, Subcommittee On
Commerce, Transportation And Tourism
Committee On Energy And Commerce
House Of Representatives**

**EPA's Preliminary Estimates Of Future
Hazardous Waste Cleanup Costs Are Uncertain**

This report evaluates the Environmental Protection Agency's Superfund Task Force preliminary study on the future resources needed to clean up the nation's worst uncontrolled hazardous waste sites. EPA's study estimates that the federal government could spend between \$8.4 billion and \$16 billion to clean up these sites. These estimates are based on uncertainties concerning the number of hazardous waste sites, the construction costs needed for the cleanup, and the extent that cleanup can be accomplished without using federal funds. Because of these uncertainties, GAO found that the range could be from \$5.3 billion to \$26 billion, which suggests a need for better data before a more useful estimate can be developed. As mandated in section 301 of the Superfund Act, EPA is currently conducting a more detailed study on cleanup costs.



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WASHINGTON, D.C. 20548

RESOURCES COMMUNITY,
AND ECONOMIC DEVELOPMENT
DIVISION

B-215014

The Honorable James J. Florio
Chairman, Subcommittee on Commerce,
Transportation and Tourism
Committee on Energy and Commerce
House of Representatives

Dear Mr. Chairman:

As you requested on November 10, 1983, we evaluated the Environmental Protection Agency's (EPA's), December 8, 1983, study on the future resources needed to clean up the nation's worst uncontrolled hazardous waste sites. This cleanup is directed under the Comprehensive Environmental Response, Compensation and Liability Act of 1980, which we will refer to as the Superfund Act.

EPA initiated its study, entitled Superfund Task Force Preliminary Assessment, to provide information that could be used in reauthorizing the Superfund Act. EPA's study was a preliminary investigation, based on data that could be obtained in a short time frame, spanning about 45 days. The study was not intended to be an exhaustive or definitive attempt to estimate the number of sites needing Superfund cleanup or how much it would cost the federal government to do the cleanup. EPA is currently conducting more detailed research on these issues as mandated in Section 301 of the Superfund Act.

According to EPA's study, 1,400 to 2,200 hazardous waste sites may require cleanup action as National Priority List (NPL) sites.¹ The study estimates that the federal government could spend between \$8.4 billion and \$16 billion in undiscounted 1983 dollars to clean up these sites.

While recognizing that EPA's study was intended as a quick preliminary estimate of the total number of NPL sites and costs to clean up these sites, we found that these estimates are sensitive to varying assumptions. Specifically, we found that

¹The National Priority List identifies hazardous waste sites that are eligible for remedial action under Superfund.

- the number of NPL sites is uncertain,
- construction costs to clean up sites are uncertain, and
- the number of NPL sites that responsible parties² will clean up and that will not require federal funds is uncertain.

We found that projected Superfund program costs can vary considerably depending on what assumptions are used because of such uncertainties. Using EPA's cost model, we analyzed alternative low and high assumptions concerning the number of NPL sites needing cleanup, site construction cost estimates, and the extent of responsible party cleanup. These alternative assumptions were made on the basis of information about past Superfund activities and EPA analyses that were available during EPA's study. Under the alternative assumptions we made, projected Superfund program cost estimates ranged from \$5.3 billion to \$26 billion. Such a large range suggests a need to develop better data before a more useful estimate can be developed.

In the following sections, we discuss key assumptions made in EPA's preliminary study and what we consider to be sources of uncertainty about these assumptions. We also indicate the potential effect of this uncertainty on Superfund program costs. In addition, we discuss several steps that could be taken to improve future cost estimates.

OBJECTIVES, SCOPE, AND METHODOLOGY

To evaluate EPA's study, we focused on key cost factors such as number of NPL sites, construction costs to clean up sites, and the extent of responsible party cleanup. We then tested the effect that alternative values for these key cost factors might have on projected Superfund program costs (sensitivity analysis). We conducted our work from November 27, 1983, to March 1, 1984, at EPA headquarters in Washington, D.C.

We obtained and analyzed background documents and other information EPA used in preparing its study. We also interviewed EPA staff responsible for preparing the study. In addition, we reviewed EPA studies on remedial technology and cleanup costs. Further, we reviewed relevant studies done for the Chemical Manufacturers Association and the Association of State and Territorial Solid Waste Management Officials, and interviewed staff responsible for these studies. These studies were done to give those organizations a better understanding of cleanup costs and the number of hazardous waste sites.

²A person, corporation, or other entity who is (1) a past or present owner or operator of a site and/or (2) a generator or transporter who contributed hazardous substances to a site.

To determine what effect uncertainties about the values of key cost factors might have on Superfund program costs, we analyzed alternative assumptions using EPA's Superfund cost model. We tested this model and verified the computed program cost estimates contained in EPA's study and used in our evaluation. The basis for analyzing alternative assumptions was historical information and EPA analyses that were available during EPA's study. More detailed information on these alternative assumptions is explained in the text and appendixes. As part of this effort, we also discuss several steps that could be taken to improve estimates of how much it will cost to clean up hazardous waste sites.

As you requested, we did not obtain agency comments. However, the matters presented in this report were discussed with EPA headquarters program officials, and their views are incorporated where appropriate. Except as noted above, we made our review in accordance with generally accepted government auditing standards.

PERSPECTIVE ON EPA'S SUPERFUND STUDY

The Congress enacted the Superfund Act in 1980 to address immediate problems posed by hazardous materials spills and hazardous waste site emergencies. The act was also designed to deal with longer term problems posed by contamination of soil, air, and water stemming from leakages at inactive hazardous waste sites. The Superfund program was to be financed by taxes levied on crude oil, imported petroleum products, and 42 petrochemical and inorganic raw materials. Approximately \$1.6 billion was to be collected in this fund over 5 years, ending in 1985.

Anticipating congressional hearings directed at reauthorizing Superfund in 1984, EPA established a Superfund Task Force to provide estimates of funds that would be required to carry out Superfund's mandate in the future. The Task Force was composed of representatives from various EPA offices. The resulting study, entitled Superfund Task Force Preliminary Assessment, was not intended to be an exhaustive or definitive attempt to estimate the number of sites needing Superfund cleanup and the costs to be incurred in meeting this end. Rather, the study is a preliminary investigation, based on information that could be obtained in a short time frame. In addition, the focus of EPA's study was on federal costs as opposed to total costs to clean up NPL sites. Total cleanup costs include additional expenses borne by state and local governments, responsible parties, and society in general.

EPA is currently conducting a more detailed, follow-up study of the number of hazardous waste sites needing to be cleaned up and the costs to achieve that cleanup. This study is to be completed by December 1984.

THE NUMBER OF FUTURE SUPERFUND SITES IS UNCERTAIN

The study estimated that approximately 1,400 to 2,200 sites will eventually be listed on the NPL, making them eligible for remedial cleanup under Superfund. At the time EPA's study was completed, the NPL contained 546 sites. The study estimated that approximately 850 to 1,650 additional sites will be added to the NPL. These estimates depend in part on subjective judgments that are not fully supported by available data.

In general, EPA's estimates of future NPL sites are based on judgments and assumptions relating to its hazardous waste site assessment process, which consists of four steps. First, a site is listed on the Emergency Remedial Response Information System (ERRIS)³ inventory. Second, all sites listed on ERRIS must undergo a preliminary assessment, which generally entails a cursory review of information about wastes at a site. Third, preliminary assessed sites with waste problems deemed serious enough must undergo a site investigation, which entails an onsite visit, sampling, and analysis of the waste problems at the site. And fourth, once a site is investigated, the seriousness of any waste problems is evaluated to determine if the site should be placed on the NPL. Usually, both state and federal regulatory officials participate in this assessment process.

During EPA's study, a preliminary assessment had been completed for 6,859 of the 16,232 ERRIS sites. Of preliminary assessed sites, about 28 percent (or 1,934) were deemed serious enough to undergo a site investigation. Of sites investigated, about 28 percent (or 546) were judged serious enough to be placed on the NPL. Sites investigated that are not placed on the NPL are not eligible for Superfund dollars but may be cleaned up using other funds collected, for example, by state governments. Using the above information, EPA made three major assumptions in extrapolating its projected NPL.

Both the Technical Advisor to the study and the Chief of EPA's Discovery and Investigation Branch, Hazardous Site Control Division, subjectively determined that approximately 22,000 sites will be listed on ERRIS, an increase of about 6,000 sites from the ERRIS inventory during EPA's study.

Second, the study assumes that about 20 percent of future sites investigated will be hazardous enough to be placed on the NPL. In the past, about 28 percent of sites investigated have been placed on the NPL. EPA's assumption is based on the theory

³A hazardous site notification and inventory system maintained by EPA headquarters and updated by the regional offices. A site is listed on ERRIS before EPA can consider the site for remedial cleanup under Superfund.

that the most hazardous sites have already been identified and future sites investigated will be less hazardous and fewer will qualify as NPL sites. EPA has also compiled information suggesting that severe waste problems at NPL sites may be declining although still serious enough to warrant these sites being placed on the NPL. While EPA data indicate that close to 20 percent of sites investigated were placed on the NPL during the last three quarters of 1983, an examination of all quarterly information indicates that the percentage of sites investigated and placed on the NPL is highly variable. The following chart shows the quarterly percentage of sites investigated that were placed on the NPL in 1982 and 1983.

<u>1982</u>	<u>Percent of sites investigated placed on the NPL</u>
-First quarter	26.5
-Second quarter	35.2
-Third quarter	25.8
-Fourth quarter	76.9
<u>1983</u>	
-First quarter	83.3
-Second quarter	14.8
-Third quarter	13.7
-Fourth quarter	39.5

Given the uncertainties about the future number of ERRIS sites and the future percentage of sites investigated and placed on the NPL, we considered several other assumptions which could mean either fewer or more NPL sites than EPA projected. We examined what the future number of NPL sites might be if this projection depended more heavily on information characterizing past Superfund program activities. First, we used the actual ERRIS inventory of 16,232 sites at the time of EPA's study and the past average of about 28 percent of preliminary assessed sites investigated and the past average of about 28 percent of sites placed on the NPL. These assumptions mean approximately 1,270 sites for the NPL rather than the 1,400 sites estimated in the EPA study. Second, we used EPA's projected ERRIS inventory of 22,000 sites but similarly applied the past average number of sites investigated and placed on the NPL. These assumptions mean about 1,746 sites for the NPL.

Third, EPA assumed that an additional 800 sites (beyond the previously projected 1,400 sites) could be added to the NPL, if EPA decides to expand the number of sites eligible for Superfund cleanup. According to EPA's study, these additional 800 NPL sites represent sites not currently considered to be included on the NPL, such as sites on federal lands and facilities, active

commercial hazardous waste disposal facilities that may become Superfund sites, closed conventional landfills, sites on Indian lands, and sites involving mining wastes or radioactive substances. The Technical Advisor to the study and the Chief of EPA's Discovery and Investigation Branch, Hazardous Site Control Division, subjectively determined this figure of 800 additional sites. Because we do not have any information suggesting that these additional sites could be either higher or lower than 800 sites, we have not considered any alternative assumptions about additional sites.

Using the assumptions discussed above, Superfund program costs could differ from EPA's estimates. For instance, using EPA's cost model, a decrease in the size of the NPL from 1,400 to 1,270 sites could decrease program costs from EPA's estimated \$8.4 billion to \$7.6 billion, in undiscounted 1983 dollars. On the other hand, an increase in the size of the NPL from 1,400 to 1,746 sites could increase program costs from EPA's estimated \$8.4 billion to \$10.6 billion, in undiscounted 1983 dollars. Counting the 800 additional sites that could become eligible for Superfund cleanup, a change in the size of the NPL from 2,200 to 2,546 could increase estimated program costs from \$16 billion to \$18.5 billion. Appendix I provides more detailed information on this matter.

CONSTRUCTION COSTS TO CLEAN UP SITES ARE UNCERTAIN

In its study, EPA acknowledges that construction cost estimates to clean up sites are considerably uncertain because there have been few actual cleanup experiences. According to EPA's most recent schedule of ongoing and completed remedial actions, less than 10 such cleanup actions have been completed. However, the variability of EPA's cost estimates resulting from such uncertainty is not shown. For example, EPA used a total construction cost estimate of \$4.5 million to clean up each NPL site not requiring groundwater decontamination. For a NPL site needing a groundwater remedy, EPA used a total construction cost estimate of \$10.5 million. EPA was unable to specifically identify the basis for the above cost estimates. However, at the time EPA's construction cost estimates were made, EPA had data showing actual expenditures from \$500,000 per site to \$33 million per site. In EPA's study, 23 percent to 56 percent of NPL sites are assumed to require groundwater remedies.

EPA has recognized the uncertainty in the construction cost estimates which it routinely makes in the process of cleaning up sites. However, this information was not used in EPA's study. In a December 1983 briefing to the Assistant Administrator for Solid Waste and Emergency Response, staff from the Remedial Action Branch, Hazardous Site Control Division, stated that the accuracy range of their construction cost estimates was plus 50 percent

to minus 30 percent when estimates were made for a site after a feasibility study⁴ had been completed. They further stated that these estimates were as much as 300 percent off when made before the feasibility study was completed. These potential ranges were indicated on the basis of EPA experiences in estimating costs, as evidenced by data which EPA has compiled on the differences between its preliminary engineering estimates and subsequent contractor bids to clean up sites. In addition, other information that EPA collected on construction costs to clean up hazardous waste sites indicates similar ranges of uncertainty.

EPA's cost estimates could overstate or understate Superfund program costs because of this uncertainty. Although it is not clear how uncertain construction cost estimates are, we subjectively chose to test the sensitivity of Superfund program costs to construction cost estimates which vary by plus or minus 50 percent. This range is close to EPA's assessment of how accurate a site estimate is once a feasibility study is completed. Using EPA's cost model, this would mean estimated Superfund program costs between \$6.2 billion and \$20.4 billion, in undiscounted 1983 dollars (rather than the \$8.4 billion to \$16 billion estimated in EPA's study). Appendix II provides more detailed information on these estimates.

NUMBER OF NPL SITES NEEDING
FEDERAL CLEANUP FUNDS IS UNCERTAIN

In estimating Superfund program costs, EPA assumed that about 37 percent of all NPL sites will not need federal cleanup funds, other than for planning and oversight costs, because responsible parties will clean up those sites. This assumption was made on the basis of historical experience and subjective judgments by staff who prepared EPA's study.

To arrive at a figure of about 37 percent for responsible party cleanup, EPA made several underlying assumptions. EPA estimated that 363 NPL sites would have feasibility studies completed by the end of fiscal year 1985 and assumed that 30 percent would be cleaned up by responsible parties. This assumption was made on the basis of historical experience. For the majority of NPL sites, with no feasibility studies, EPA assumed about 40 percent would be cleaned up by responsible parties. This assumption was made on the basis of subjective judgments, which are described in appendix III.

⁴Consists of a detailed analysis of the remedial alternatives to clean up a site, including the cost-effectiveness of these remedial choices.

One indication of the uncertainty about responsible party cleanup is alternative assumptions that EPA considered but did not include in its study, that as little as 29 percent to as many as 44 percent of all NPL sites might be cleaned up by responsible parties. EPA is continuing to study these alternative assumptions. In appendix III, we indicate that, depending on which of these assumptions is chosen, Superfund program costs could be \$1.3 billion higher or lower than EPA's estimates in its preliminary study.

OVERALL EFFECT OF UNCERTAINTIES
ON SUPERFUND PROGRAM COSTS

An indication of the overall effect on future Superfund program costs caused by uncertainties about the number of NPL sites, construction costs, and the number of NPL sites needing federal cleanup funds can be seen by using EPA's cost model. Using this model, we factored in previously discussed alternative assumptions about the number of NPL sites, construction costs per site, extent of responsible party cleanup, and number of sites needing groundwater cleanup. As a measure of the overall effect of uncertainties, we computed the high and low Superfund program cost estimates resulting from all of these assumptions.

A high value of \$26 billion, in undiscounted 1983 dollars, results from the following alternative values:

- 2,546 NPL sites (see app. I),
- construction cost estimates of \$6.75 million for a non-groundwater cleanup and \$15.75 million for a site requiring groundwater cleanup (see app. II),
- 29 percent of these sites cleaned up by responsible parties (see app. III), and
- 56 percent of all sites needing groundwater cleanup (see p. 6).

A low value of \$5.3 billion results when assuming:

- 1,270 NPL sites (see app. I),
- construction cost estimates of \$2.25 million for a non-groundwater cleanup and \$5.25 million for a site requiring groundwater cleanup (see app. II),
- 44 percent of these sites cleaned up by responsible parties (see app. III), and
- 23 percent of all sites needing groundwater cleanup (see p. 6).

The range of costs suggests a need for better data before a more useful estimate can be developed.

TOTAL CLEANUP COSTS INCLUDE
OTHER EXPENSES IN ADDITION
TO SUPERFUND PROGRAM COSTS

EPA's study focused solely on Superfund program costs but referred to a number of other expenses besides those costs that are necessary to clean up the worst hazardous waste sites in the nation. EPA did not provide estimates of these costs in its study. These expenses include

- the states' share of construction costs and the first 2 years of expenses to operate and maintain remedial controls (currently, states pay for 10 percent of these costs at most sites cleaned up with Superfund dollars, while the federal government pays 90 percent of these costs) and
- long-term operation and maintenance costs to ensure continued control of waste problems at NPL sites (currently, states and responsible parties pay these costs).

Other expenses not explicitly mentioned in EPA's study include

- state and local government expenses for administration and enforcement and
- construction and short-term operation and maintenance costs incurred in responsible party cleanups.

These other costs could add billions of dollars to the projected total cleanup bill. For example, using EPA's cost model, we found that states and responsible parties could spend nearly \$7.8 billion (in undiscounted 1983 dollars) for construction and short-term operation and maintenance expenses. Using EPA's estimates of annual operation and maintenance costs and projecting these expenses over an additional 18 years indicated that another \$18.7 billion in long-term operation and maintenance costs could be incurred. This estimate assumes an NPL list of 2,200 sites, 56 percent of these sites requiring groundwater treatment, and an operation and maintenance period of 20 years for each site.

THE TIMING OF CLEANUPS IS RELEVANT

Although EPA's study recognizes that the timing of EPA's cleanup efforts is important in estimating cleanup costs, the study notes that too much uncertainty now exists to accurately predict an annual program level. EPA stated that 14 years could elapse before waste problems at 1,800 NPL sites (a midpoint in

EPA's range of 1,400 to 2,200 sites) are addressed. Whether EPA can meet this schedule within its cost estimates depends on the prices and availability of the skills and resources needed to accomplish that objective.

Other considerations that are relevant to how the timing of EPA's cleanup efforts affect program costs are the need to discount future costs and account for future inflation. Costs incurred in the future should be discounted by an appropriate rate of interest. Discounting determines the amount of money which, if invested today at a selected interest rate, would be sufficient to meet expected future costs. The rate of expected inflation is also relevant to funding needs. However, for these refinements to be meaningful, an accurate year-by-year cleanup schedule would be necessary. For this reason, we did not discount our cost projections nor did EPA discount its cost estimates.

A COMPARISON OF ALTERNATIVE LEVELS OF CLEANUP IS RELEVANT

EPA's study notes that in the future EPA may be able to estimate the reduction in health risks that can be expected from alternative levels of cleanup. EPA may then be able to estimate how much it costs to reduce health risks by varying amounts.

This information can be useful in comparing the costs of alternative levels of cleanup and deciding how clean is clean enough. For example, suppose substantial health risks remain as a result of choosing a less stringent level of cleanup. One cost of choosing this cleanup level rather than a more stringent level is the added health risk. By comparison, choosing a more stringent level of cleanup will mean higher cleanup expenditures.

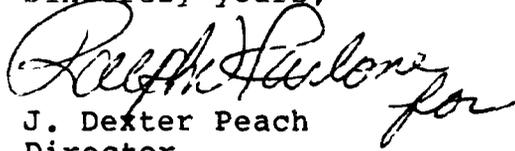
IMPROVEMENTS IN FUTURE EPA COST ESTIMATES

EPA is currently making more detailed analyses which could lead to improved estimates of future costs to clean up NPL sites. As part of this effort, EPA's contractor has surveyed 82 sites. Average cost-per-site estimates are being generated. In another effort mandated in section 301 of Superfund, EPA is reviewing an analytic framework for estimating remaining hazardous waste problems and the associated cleanup costs, once the current Superfund tax expires. EPA's contractor for this study has proposed using a random sample of 190 sites from the ERRIS data base to make these projections. According to the contractor, an intensive analysis of about 200 sites appears feasible in terms of timing and resources to meet the December 1984 deadline mandated in section 301. Not enough information was available to determine whether or not statistically valid estimates can be derived from this sample.

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As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 14 days from the date of its issuance. At that time we will send copies to interested parties and make copies available to others upon request.

Sincerely yours,

A handwritten signature in cursive script, appearing to read "J. Dexter Peach", with a flourish extending to the right.

J. Dexter Peach
Director

SIZE OF THE NATIONAL PRIORITY LIST

The chart on the following page indicates that Superfund program costs vary by billions of dollars depending on the number of NPL sites that must be cleaned up. EPA's study estimates that the NPL could grow to 1,400 - 2,200 sites, with corresponding program costs ranging from \$8.4 billion to \$16 billion. Using EPA's cost model, lower program costs resulted when we assumed an ERRIS inventory of 16,232 sites and the historical average of about 28 percent of preliminary assessed sites being site investigated and about 28 percent of sites investigated being placed on the NPL. These assumptions resulted in a projected NPL size of about 1,270 sites, with corresponding program costs of \$7.6 billion to \$9.0 billion. Similarly, higher program costs resulted when we assumed EPA's estimated ERRIS inventory of 22,000 and the historical average of about 28 percent rather than EPA's assumption of 20 percent (see pages 4 and 5 for description of the basis for our assumptions). These assumptions resulted in a projected NPL size of from 1,746 to 2,546 sites, with corresponding program costs of \$10.6 billion to \$18.5 billion. Each of the above cost estimates also depends on what percent of NPL sites are assumed to require groundwater cleanup. Using EPA's assumptions, program costs were computed assuming that 23 percent to 56 percent of NPL sites will require groundwater cleanup.

Superfund Program Costs
for Selected NPL Estimates

	<u>Number of sites</u>	Low case (23 percent of sites <u>require ground- water cleanup</u>)	High case (56 percent of sites <u>require ground- water cleanup</u>)
		(billions)	
GAO simulation ^a	1,270	\$ 7.6	\$ 9.0
EPA estimate of NPL sites ^b	1,400	8.4	10.0
GAO simulation ^c	1,746	10.6	12.7
EPA estimate of NPL sites ^d	2,200	13.4	16.0
GAO simulation ^e	2,546	15.5	18.5

^aAssumes 16,232 ERRIS sites, of which 28 percent are site investigated, and 28 percent are placed on the NPL.

^bAssumes 22,000 ERRIS sites, of which 28 percent are site investigated, and 20 percent of sites investigated are placed on the NPL.

^cAssumes 22,000 ERRIS sites, of which 28 percent are site investigated, and 28 percent of sites investigated are placed on the NPL.

^dAssumes 22,000 ERRIS sites, of which 28 percent are site investigated, and 20 percent of sites investigated are placed on the NPL, plus 800 additional NPL sites.

^eAssumes 22,000 ERRIS sites, of which 28 percent are site investigated, and 28 percent of sites investigated are placed on the NPL, plus 800 additional NPL sites.

GAO note: All calculations were derived from EPA's cost model used in EPA's study. Costs are in undiscounted 1983 dollars. All calculations are rounded to the nearest \$100 million.

UNCERTAINTY IN EPA'S CONSTRUCTION

COST ESTIMATES

The following chart indicates how estimated Superfund program costs vary when construction is assumed to be either less or more expensive than the estimates used in the EPA study. The low case in the chart assumes that construction costs for groundwater and non-groundwater cleanups are 50 percent lower than EPA's values. The high case assumes that these costs are 50 percent higher (see pages 6 and 7 for description of the basis for these assumptions). Construction costs account for about 50 percent of program costs in the case of 2,200 sites with 56 percent needing groundwater cleanup.

Superfund Program Costs
Assuming a 50-Percent Error Margin
in Construction Cost Estimates

<u>Program size and percent of sites requiring groundwater remedies</u>	<u>Construction costs per site</u>		
	<u>Low case GAO simulation (minus 50 percent)</u>	<u>EPA's estimate</u>	<u>High case GAO simulation (plus 50 percent)</u>
	----- (billions) -----		
1,400 sites			
23 percent	\$ 6.2	\$ 8.4	\$10.5
56 percent	7.2	10.0	12.8
2,200 sites			
23 percent	10.0	13.4	16.8
56 percent	11.5	16.0	20.4

GAO note: All calculations were derived from EPA's cost model and are in undiscounted 1983 dollars. All calculations are rounded to the nearest \$100 million.

RESPONSIBLE PARTY CLEANUPS

The chart on the following page indicates that Superfund program costs vary by hundreds of millions of dollars depending on assumptions made about responsible party cleanups.

In arriving at a figure of about 37 percent for responsible party cleanup, EPA made a number of assumptions. EPA estimated that 363 NPL sites would have feasibility studies completed by the end of fiscal year 1985 and assumed that responsible parties would care for about 30 percent of the sites. For the remaining sites, numbering about 1,037 for an NPL of 1,400, EPA assumed that half would be so-called enforcement lead sites and the other half would be program lead sites. In an enforcement lead site, arranging a responsible party cleanup is EPA's priority, whereas in a program lead site, government cleanup is emphasized. EPA then assumed that 2 percent of the enforcement lead sites and 5 percent of the program lead sites would not require cleanup upon further site investigation. EPA assumed that responsible parties would care for 70 percent of the remaining enforcement lead sites and 10 percent of the remaining program lead sites.

GAO's simulations are made on the basis of EPA's consideration of alternative assumptions about the percentage of enforcement lead sites cared for by responsible parties. EPA has assumed that as many as 90 percent and as few as 50 percent of these sites would be cleaned up by responsible parties. An assumption of 90 percent translates to about a 44-percent overall responsible party cleanup. Assuming 50 percent means about 29 percent of all sites would be cared for by responsible parties.

Superfund Program Costs Assuming
Lower and Higher Responsible Party
Cleanup Than In EPA's Study

<u>Percent of NPL sites financed by responsible parties and program size</u>	<u>Low case (23 percent of sites require groundwater cleanup</u>	<u>High case (56 percent of sites require groundwater cleanup</u>
	(billions)	
44 percent (GAO low case simulation)		
1,400 sites	\$ 7.8	\$ 9.2
2,200 sites	12.3	14.6
37 percent (EPA's estimate)		
1,400 sites	8.4	10.0
2,200 sites	13.4	16.0
29 percent (GAO high case simulation)		
1,400 sites	9.0	10.8
2,200 sites	14.4	17.3

GAO note: All calculations were derived from EPA's cost model and are in undiscounted 1983 dollars. All calculations are rounded to the nearest \$100 million.

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